



**Faculty of Science
Department of Botany**

**Vegetation study on Al-Jabal Al-Akhdar with special
emphasis on endangered species -Libya**

THESIS

**Submitted for the degree of Doctor of Philosophy of Science in
Botany (Plant Ecology)**

By

Mabroka Abdalla Gbrial Abdalrhim

B.Sc. Special Biology (2007)

M.Sc. Special Botany (2011)

**Ain Shams University
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Department of Botany**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
(الَّذِي جَعَلَ لَكُم مِّنَ الشَّجَرِ الْأَخْضَرِ نَارًا فَإِذَا
أَنْتُمْ مِنْهُ تُوقِدُونَ)

صدق الله العظيم
يس... آية رقم ٨٠

Dedication

All praise to **Allah**, today we fold the days' tiredness and the errand summing up between the cover of this humble work.

To the utmost knowledge lighthouse, to our greatest and most honored prophet **Mohamed - May peace and grace from Allah be upon him**

To the spring that never stops giving, to my mother who weaves my happiness with strings from her merciful heart... to **my mother**.

To whom he strives to bless comfort and welfare and never stints what he owns to push me in the success way who taught me to promote life stairs wisely and patiently... to my **dearest father**.

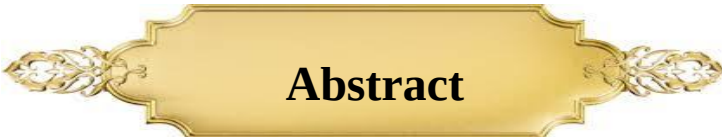
To whose love flows in my veins and my heart always remembers them... to my **brothers**, my **sisters** and **my son**.

This project is dedicated to **my husband, Ahmed**; he was my inspiration for doing my project. I will always remember him and appreciate his supporting to me.

To those who taught us letters of gold and words of jewel of the utmost and sweetest sentences in the whole knowledge. Who reworded to us their knowledge simply and from their thoughts made a lighthouse guides us through the knowledge and success path. To our honored **teachers** and **professors**.



Mabroka Abdalla Gbrial Abdalrhim



Abstract

Al-Jabal Al-Akhdar Mountain is the richest vegetation and highest species diversity in Libya. Soil factors play an important role in growth, chemical composition and distribution of plants under different ecosystems in Al-Jabal Al- Akhdar. In the present work, 63 soil sample supporting the growth of the different studied species (especially the twelve selected endangered plant species), were collected from seven site located along the Al-Jabal Al- Akhdar.

Regarding the number of species within each family, the abundant families were Asteraceae which has the highest contribution to the total number of the recorded species (comprising sixteen species with ratio 18%), followed by Lamiaceae comprising twelve species (14%), Fabaceae comprising five species (6%), Apiaceae comprising four species (5%) and Poaceae comprising three species (3 %).

Dieback of *Juniperus phoenicea* trees in a natural growing area on (Al-Marj-Al-Baida motorway) in the Al-Jabal Al-Akhdar, during 2015 and 2016. Fungal isolates obtained from symptomatic twigs and branches showing dieback and bark necrosis. The present study showed that *Ascotricha chartarum* is directly involved in the etiology of branch dieback and mortality of *Juniperus phoenicea* trees.

Keyword: Al-Jabal Al- Akhdar – Endemic – Endangered - *Juniperus phoenicea*-Dieback

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Introduction

Libya comprises three major provinces: Tripolitania, Cyrenaica and Fezzan. Tripolitania extends over the north western corner of the country and Fezzan south of Tripolitania. Cyrenaica, the largest geographic region, covers the entire eastern half of the country. Cyrenaica holds Al-Jabal Al-Akhdar which is true to its name, green and also the most vegetated part of the country (Johnson, 1973).

Al-Jabal Al-Akhdar region at the north east of Libya has considerable potential for agricultural activities since the natural resources are promising.

The rapid increase in the population in the last few decades represents many problems and needs to keep balance between food production and population projection. There-fore, much attention must be paid to evaluate land resources and provide the decision makers with important data which help in the planning of land use and sustainable development. Land evaluation refers to the assessment of land performance when used for specified purposes (Sys *et al.*, 1991).

Awareness of the endangered plants problem has increased in recent years, accompanied by recognition of human responsibility for continued environmental degradation. The degradation of land may result from climatic variability and also negative human activities such as over cultivating, overgrazing, deforestation and wild land fire amongst others (FAO, 2007). The human activities in the last few decades have dramatically affected the biodiversity of Al-Jabal Al-Akhdar. In recent days, this effect has been intensified due to the increase in the population and the import of modern mechanization which has caused an increase (in both density and area) of the destructive effects of human activities. Although this region is one of the

important areas of wildlife in Libya, it suffers from extreme biodiversity destruction and degradation and it is very important now to begin extensive environmental studies and conservation programs, including not only soil and biodiversity conservation but also beauty conservation and attention to local inhabitants because they play an important role in the ecosystem throughout the whole area (El-Barasi and Manam, 2013). Removal of natural vegetation and the disintegration of natural forests are growing very rapidly in many parts of the Green Mountain, where forest fragmentation has been a common occurrence in the past few decades. A greater part of the surviving shrub cover in the upper and lower terraces of Al-Jabal Al-Akhdar and their escarpments consist of isolated patches and disconnected corridors. The primary cause of fragmentation is agricultural development especially clearing the land for dry farming (El-babour, 2007).

Major natural reasons affecting this degradation processes often are climate and aridity, which lead to reduction in the plant cover; and soil depth. Besides these, the human-induced reasons leading to this process are fires, felling and overgrazing (Kosmas *et al.*, 1999; Desertlinks, 2001).

Soil study and the interactions between soil and other components of the ecosystem, provides us with the prerequisite knowledge to minimize the degradation and destruction of one the most important natural resources of the soil. Soil factor play an important role in growth, chemical composition and distribution of plants under different ecosystems.

However their impact on climate, soil and water resources, even in the absence of scientific studies on these effects, is clear when comparing this region with other regions in Libya. Also these forests are a significant source of charcoal and firewood and provide protection and pasture for grazing animals (Eldoumi *et al.*, 2002). For example wood energy and charcoal are